

9.0 DESIGN AND CONSTRUCTION PACKAGE

This section describes the USACE regulations applicable to the design and design document components that must be included in the design and construction package. These includes:

- Applicable USACE Design policy and Requirements,
- Design Document Components, and
- Construction Package

9.1 APPLICABLE USACE DESIGN POLICIES AND REQUIREMENTS

The following USACE regulations apply to the development of design documents in their various stages for the USACE:

<u>Regulation</u>	<u>Title</u>
ER 1110-345-100	Engineering and Design - Design Policy for Military Construction
ER 1110-345-700	Engineering and Design - Design Analyses
ER 1110-345-710	Engineering and Design - Drawings
ER 1110-345-720	Engineering and Design - Construction Specifications
ER 1110-2-1150	Engineering and Design - Civil Works
TM 5-814-5	Sanitary Landfill

and other regulations as applicable.

9.2 DESIGN DOCUMENT COMPONENTS

This section outlines the various design packages that are typically required for proper installation and operation. USACE-CEGS guidance specifications, which are typically included in each design document, are listed beneath each design component.

9.2.1 Work Plans

- Safety, Health, and Emergency Response;
- Chemical Data Quality Control;
- Sampling, Analysis, and Disposal of Waste; and
- Air/Gas Monitoring

9.2.2 Background

- Geotechnical characteristics,
- Geohydrological characteristics,
- LFG Gas characteristics,
- Control technology selected,
- Equipment descriptions,
- Monitoring and control, and
- Performance requirements.

9.2.3 Calculations

- Geohydrological calculations;
- Landfill refuse volume;
- Gas phase calculations;
- Number of wells/trenches;
- Radius of influence/distance;
- Equipment sizing (pipe header, blowers, pumps, valves);
- Condensate volume; and Utility requirements.

9.2.4 Records

- Data for refuse disposal,
- Aerial map of landfill,
- LFG elevation Map,
- Equipment literature/catalog, and
- Environmental performance criteria.

9.2.5 Construction Plans and Drawings

Plans. Construction plans include:

- Location map,
- General plan,
- Landfill sampling points used in the investigation,
- Equipment layout plan,
- Wells/piping plans,
- Electrical distribution plan, and
- Site control plan,

Drawings. Construction drawings include the following:

- Process Flow Diagrams;
- Process and Instrumentation Diagrams;
- Civil drawings;
 - Locations of wells,
 - Locations and sizes of all header lines and pipe Support (if aboveground),
 - Locations of all in-line isolation valves,
 - Locations of all condensate knock-out pots,
 - Locations of treatment system,
 - Locations of condensate force Main,
 - Locations of all monitoring probes,
 - Details of gas extraction well construction,
 - Details of monitoring probe construction,
 - Details of condensate sump construction,
 - Details of in-line isolation valves and monitoring stations, and
 - Wells sections and details;
- Mechanical Drawings:
 - Locations of pumps for condensate,
 - Locations of storage tanks for condensate,
 - Locations of blowers,
 - Details of flare Unit,
 - Details and schedule for condensate sump pumps,
 - Details of condensate holding tanks, and
 - Schedule of pipes and fittings;

- Electrical Drawings:
 - Locations of power distribution to be constructed on-site,
 - Electrical duct and conduit schedule,
 - Electrical one-line diagram for the flare support building and flare,
 - Heat trace panel wiring diagram, if applicable,
 - Control panel layout with control switches, and
 - All necessary legends and schedules.
- Utility Drawings:
 - Electricity,
 - Air, water and telephone

9.2.6 Equipment Drawings

Major System Components

- Flare
- Blower,
- I.C. Engine, if applicable,
- Incinerator, if applicable,
- Scrubber, if applicable, and

Accessories

- Condensate pumps,
- Storage and process vessels,
- Piping,
- Valves, and
- Chemical feed systems.

Special Items

- Flame arrestors,
- Heat sensors, and Thermocouples.

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9.3 OTHER REQUIREMENTS

- Contract close-out,
- Contract quality control,
- Temporary construction facilities, and
- Environmental protection.

9.4 CONSTRUCTION PACKAGE

In addition to the documents listed in previous Sections 9.2, 9.3, and 9.4 in the design documents, the construction package will include, as a minimum, the following documents:

9.4.1 Construction Specifications

- Invitation for bids,
- Information for bidders,
- Statement of Bidders's Qualifications,
- Contract Agreement,
- Performance Bond,
- General Conditions,
- Special Conditions,
- Construction Specifications, and
- Equipment Specifications.

9.4.2 USACE Guide Specifications

CEGS Number	Title	Date
01030	Metric Measurements	Sep 93
01110	Safety, Health and Emergency Response	Apr 94
02685	Gas Distribution System	Dec 93
15250	Thermal Insulation for Mechanical Systems	Jul 89
15488	Gas Piping Systems	Jan 89
16370	Electrical Distribution System, Aerial	Jan 93

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16375	Electrical Distribution System, Underground	Nov 92
15330	Wet Sprinkler Systems	Jun 94
16665	Static Electricity Protection System	Jul 89
16670	Lightning Protection System	Dec 88